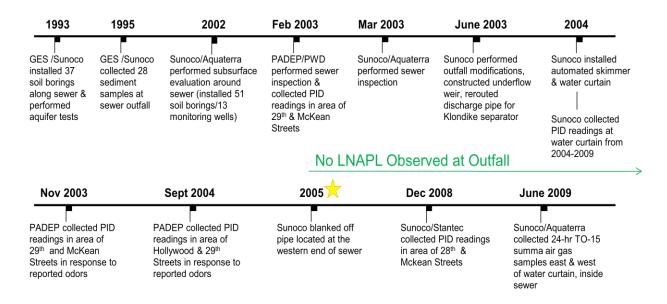
#### Timeline of Jackson St. Sewer Investigations



#### **Jackson Street Sewer Detailed Investigation Timeline Description**

1993 – GES installed 37 soil borings along sewer and performed aquifer testing.

1995 – GES collected 28 sediment samples from sewer outfall.

December 2002 – PADEP performed inspection and collected PID readings in area of 29<sup>th</sup> and McKean Streets in response to residents complaining about odors coming from sewer. Results: Petroleum odor present, PID readings ranged from 0.0 to 40.0 ppm/Source of odor

2002 – Sunoco/Aquaterra performed subsurface evaluation around sewer. Installed 51 soil borings and installed 13 monitoring wells.

Results: Separate phase hydrocarbons existed in subsurface proximal to sewer.

February 2003 - PADEP performed inspection and collected PID readings in area of 29<sup>th</sup> and McKean Streets in response to residents complaining about odors coming from sewer. Results: Petroleum odors present and PID readings ranged from 0.0 to 53.7 ppm.

Feb 2003 – PADEP/PWD performed sewer inspection.

Results: Overall structural condition of sewer was good. Observed evidence of hydrocarbons in the sewer using UV light. Increased amounts of hydrocarbons observed towards western portion of sewer.

March 2003 – Sunoco/Aguaterra performed sewer inspection.

Results: Mapped locations of hydrocarbon seep areas by use of UV light and visual observations inside sewer. Identified locations of other pipes tying into sewer.

June 2003 – Sunoco performed outfall modifications. Constructed underflow weir. Rerouted the discharge pipe from Klondike separator.

September 2003 – Sunoco automated skimmer and installed water curtain.

November 2003 - PADEP performed inspection and collected PID readings in area of 29<sup>th</sup> and McKean Streets, and 27<sup>th</sup> Street and Snyder Avenue in response to residents complaining about odors coming from sewer.

Results: Petroleum odors present and PID readings ranged from 0.0 to 239 ppm.

September 2004 – PADEP performed inspection and collected PID readings in area of Hollywood and 29<sup>th</sup> Streets in response to residents complaining about odors coming from sewer.

Results: Petroleum odors present and PID readings ranged from 0.0 to 22.4 ppm.

September 2005 – PADEP performed inspection and collected PID readings to follow up on reports of odors coming from Hollywood and McKean Streets.

Results: No odors or PID readings reported.

2005 – Sunoco blanked off pipe located at the western end of the sewer which was discharging NAPL into sewer.

Results: Reduced amount of sheening/NAPL observed at outfall.

December 2008 – Sunoco/Stantec completed air monitoring in vicinity of Jackson and McKean Streets using a PID.

Results: No PID readings recorded.

2004 – 2009 – Sunoco monitors system weekly and collects PID monitoring data east and west of the water curtain area.

June 2009 – Sunoco/Aquaterra collected 24-hour TO-15 summa air gas samples east and west of the water curtain alongside and inside of sewer.

Results:

- Benzene was above the PADEP residential indoor air screening criteria on-site in Manhole No. 3 sample location;
- No benzene detections east of water curtain or off-site in sewer near residential neighborhood;
- Chloroform was above the residential MSC west of water curtain (Manhole No. 1) and off-site in sewer (Manhole No. 6); and
- No exceedances of residential MSCs in background ambient air sample.

With the exception of the above mentioned compounds, all other TO-15 compounds were below their respective PADEP residential indoor air screening criteria. Methane was present in two of the samples (Manhole No. 3 and Manhole No. 6), however there is no PADEP residential indoor air screening criteria for methane.

# Jackson Street Sewer Figures

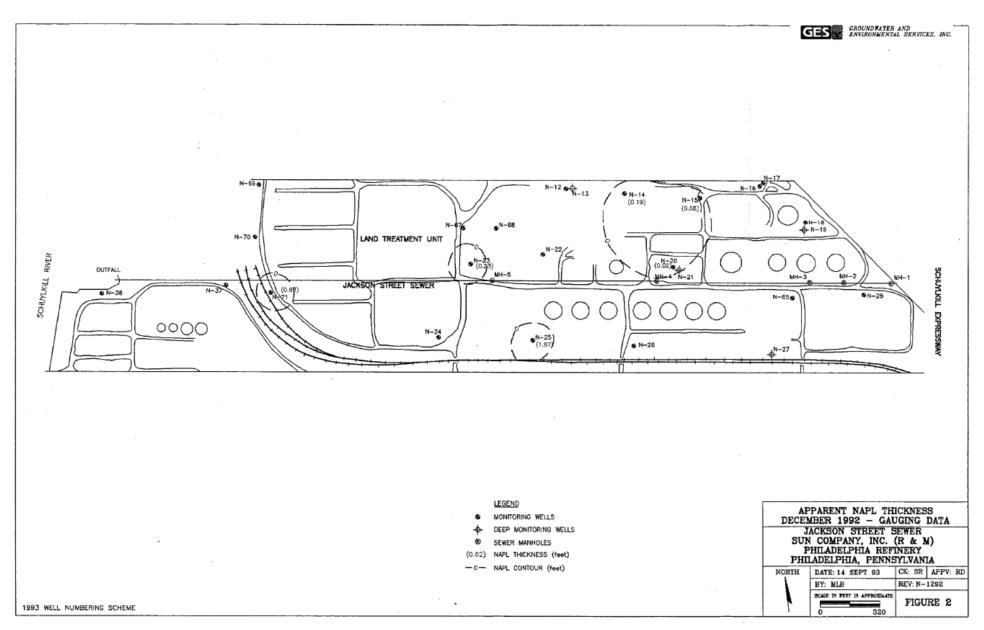
1992 & 2002-2008

1993 Comprehensive Remedial Plan

#### **OBSERVATIONS**

4 Plumes – N-71, N-23, N-25 and (N-14,N-15,N-20)

All but N-25 are less than 1 foot thick



Point Breeze 4th Quarter 2003 Report (pg. 43) **OBSERVATIONS** 

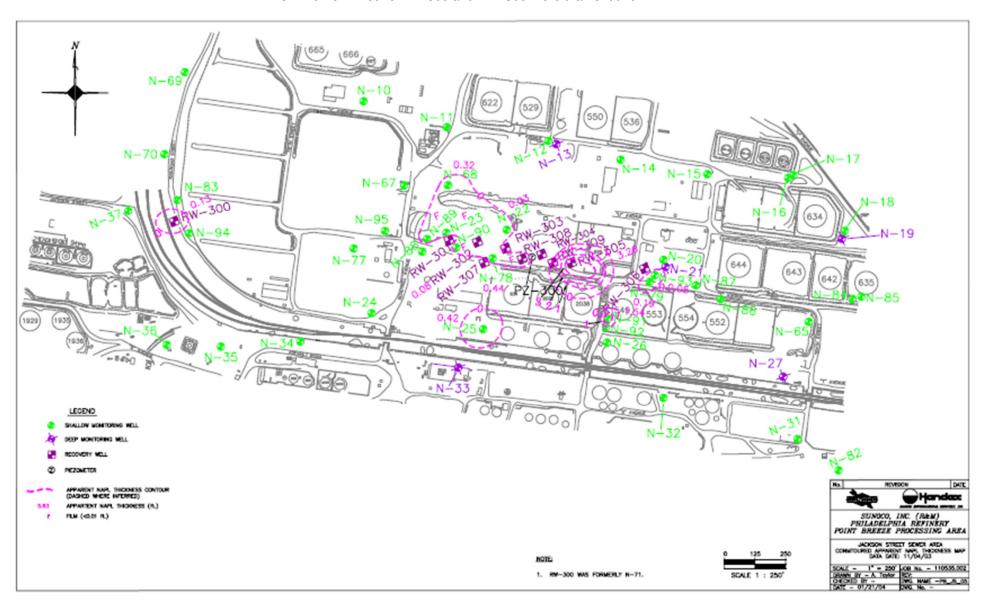
N-71 now RW-300 – Plume thickness decreased

N-23 – Plume size increased to N-68,N-89,RW-302,N-78,RW-308, and N-22 (thickness less than .5 ft)

N-14,N-15,N-20 – Plume is gone

N-25 - Plume thickness decreased to less than .5 ft

New Plume – Around RW-305 and RW-309 more than 3 ft thick



Point Breeze 2nd Quarter 2004 Report (pg. 41)

#### **OBSERVATIONS**

RW-300 - Plume thickness increased

N-23 – Plume size changed to N-68,N-89,RW-302,RW-301,N-78, and N-22 (thickness less than .5 ft)

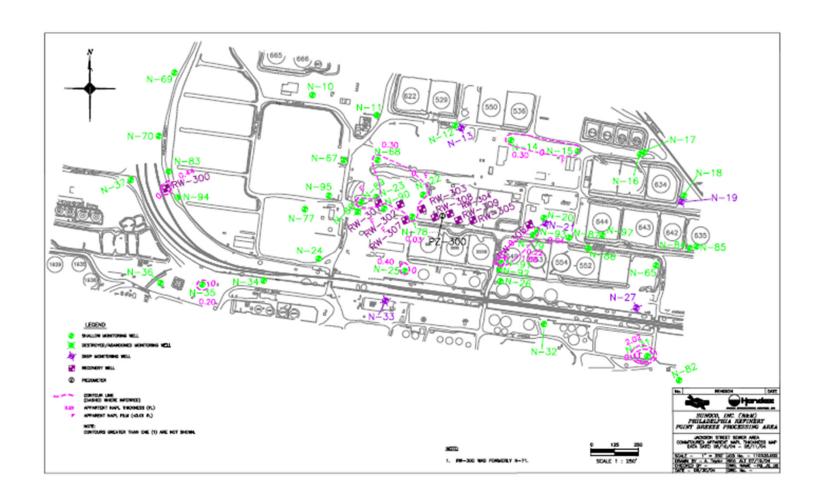
N-14,N-15,N-20 – Plume is back around N-14 and N-15 (less than .5 ft)

N-25 - Plume thickness decreased slightly

Plume around RW-305 and RW-309 is gone

New Plume around N-91, N-79, and N-93 (more than a foot thick around N-91)

New Plume around N-35 (less than .5ft thick)



Point Breeze 4th Quarter 2004 Report (pg. 257)

**OBSERVATIONS** 

RW-300 – Plume thickness decreased to a film

N-23 no longer in the plume – Plume size changed to N-89,N-90,RW-302,RW-301,N-78, and N-22 (thickness increased to less than 1 ft)

New Plume at N-68 – separated from the N-23 plume

2 Plumes combined to include N-91, N-79, RW-306, N-93, N-14 and N-15 (less than 1 ft thick)

N-25 – Plume thickness increased

Plume around N-35 thickness decreased slightly



Point Breeze 2nd Quarter 2005 Report (pg. 83)

#### **OBSERVATIONS**

RW-300 - Plume thickness remained same

Plume size decreased to multiple separate plumes - N-89, N-78, and N-22 are all separate plumes (thickness decreased to film in N-89 and N-78, thickness less than .5 ft in N-22)

Plume at N-68 – increased in thickness slightly

Plume N-91, N-79, RW-306, N-93, N-14 and N-15 changed - Separate plume N-14 and Plume RW-305,

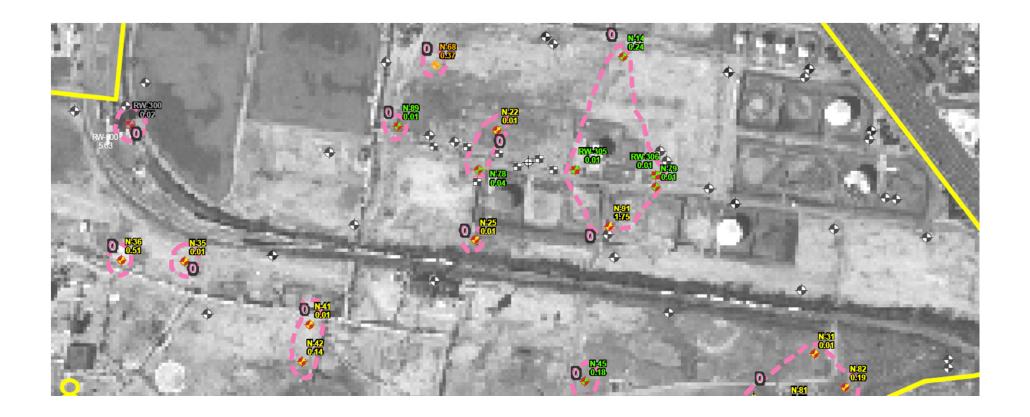
RW-306, N-91 and N-79 thicknesses less than .5 ft

N-25 – Plume thickness decreased slightly

Plume around N-35 thickness decreased slightly



Point Breeze 4th Quarter 2005 Report (pg. 50) OBSERVATIONS
RW-300 – Plume thickness increased slightly
Plume size changed to plumes - N-89, and N-78 and N-22 as a combined plume
Plume at N-68 – increased in thickness slightly
Separate plume N-14 is now combined with Plume RW-305, RW-306, N-91 and N-79
N-25 – Plume thickness decreased slightly
Plume around N-35 thickness decreased slightly
New Plume around N-36 thickness around .5 ft



Point Breeze 2nd Quarter 2006 Report (pg. 97)

#### **OBSERVATIONS**

RW-300 – Plume thickness increased slightly and now includes N-94 and N-83

Plume size changed to plumes - N-89 no longer plume, and N-78 and N-22 as separate plumes

Plume at N-68 – decreased in thickness slightly

Separate plume N-14 is now separated from Plume RW-305, RW-306, N-91 and N-79 (now plume includes N-93, and N-92)

N-25 – Plume thickness increased slightly

Plume around N-35 thickness increased slightly

Plume around N-36 is now gone



Point Breeze 4th Quarter 2006 Report (pg. 28)

#### **OBSERVATIONS**

RW-300, N-94 and N-83- Plume thickness decreased slightly

N-89 plume returns and includes N-23

Plume N-78 thickness increased slightly

Plume N-22 is no longer present

Plume at N-68 – increased in thickness slightly

Plume N-14 thickness decreased slightly

Plume RW-305, RW-306, N-91, N-79, N-93, and N-92 now includes N-26 and has increased in thickness

N-25 – Plume thickness increased Plume around N-35 no longer present



Point Breeze 4th Quarter 2007 Report (pg. 35)

#### **OBSERVATIONS**

RW-300, N-94 and N-83- Plume thickness increased slightly but no longer includes N-83

N-89 plume no longer present

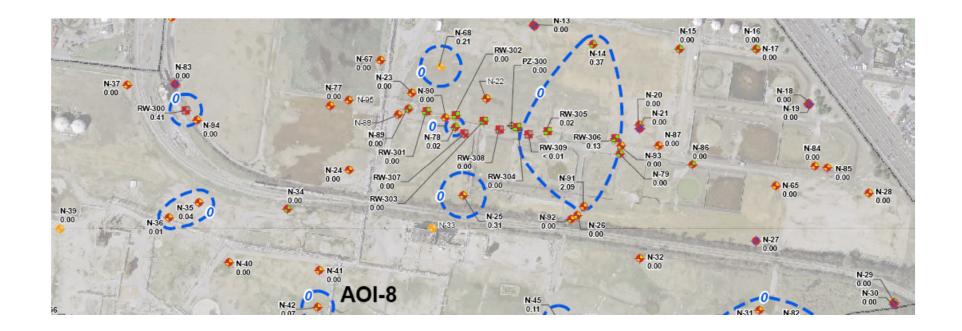
Plume N-78 thickness decreased slightly

Plume at N-68 – decreased in thickness slightly

Plume N-14 combined with Plume RW-305, RW-306, N-91, N-79, N-93 now includes RW-309 and no longer includes N-92 and N-26

N-25 – Plume thickness decreased

Plume around N-35 returns and includes N-36



Point Breeze 2nd Quarter 2008 Report (pg. 32)

#### **OBSERVATIONS**

RW-300 and N-94- Plume thickness increased slightly but no longer includes N-94

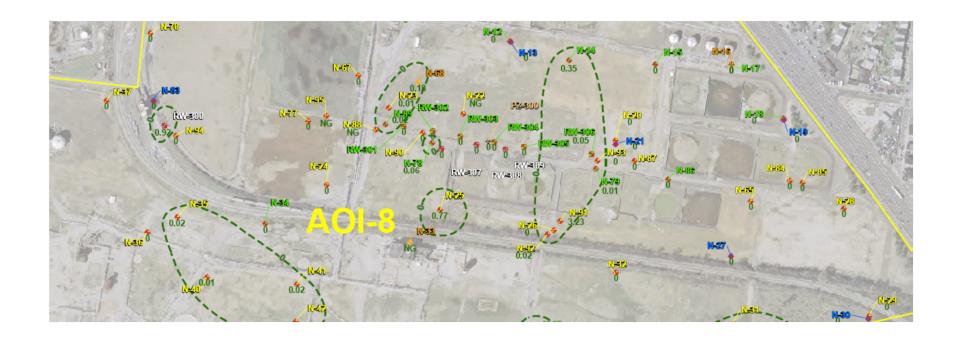
N-89 plume returns and now includes N-23 and N-68

Plume N-78 thickness increased slightly

Plume N-14 combined with Plume RW-305, RW-306, N-91, N-79, N-93 now includes RW-309 and no longer includes N-92 and N-26

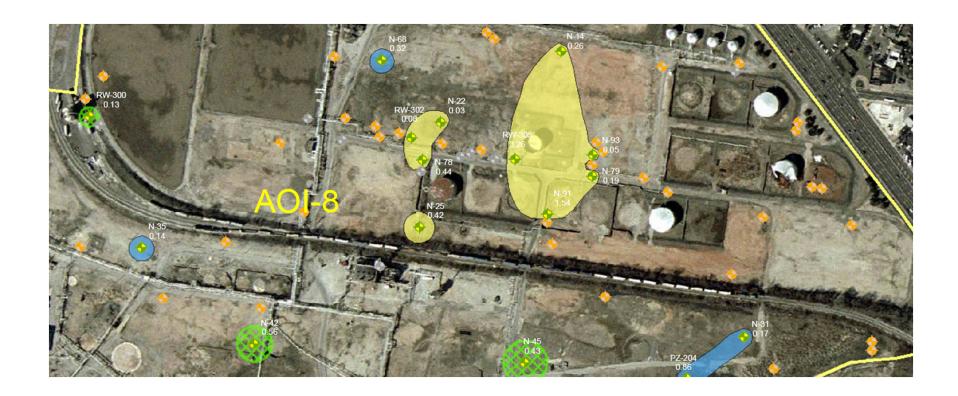
N-25 – Plume thickness decreased

Plume around N-35 and N-36 increases and now includes – N-35, N-40, N-45 and N-42



CCR - Figure 5 data collected 11/2003

OBSERVATIONS
RW-300 Plume thickness decreased slightly
N-89, N-23 and N-68 plume no longer present
Plume N-78 now includes RW-302 and N-22
Plume N-14, RW-305, RW-306, N-91, N-79, N-93 RW-309 no longer includes RW-306, or RW-309
Plume N-25 thickness decreased slightly
Plume around N-35, N-36, N-35, N-40, N-45 and N-42 changes to 2 small plumes – plume N-35 and plume N-42



AOI 8 SCR - Figure 11 10/2003 **OBSERVATIONS** 

RW-300 Plume thickness increased slightly

N-68 plume returns and includes N-107

Plume N-78, RW-302 and N-22 no longer present

Plume N-14, RW-305, N-91, N-79, N-93 now broken into smaller plumes – Plume N-14, Plume N-91 and

Plume N-79 and RW-306

Plume N-25 thickness increased slightly

Plume N-35 no longer present

Plume N-42 now includes N-116



# North Yard – Bulkhead Area Figures

2002 - 2008

# Point Breeze 4th Quarter 2003 Report (pg. 97)

#### **OBSERVATIONS**

5 separate plumes present with thicknesses under .5ft

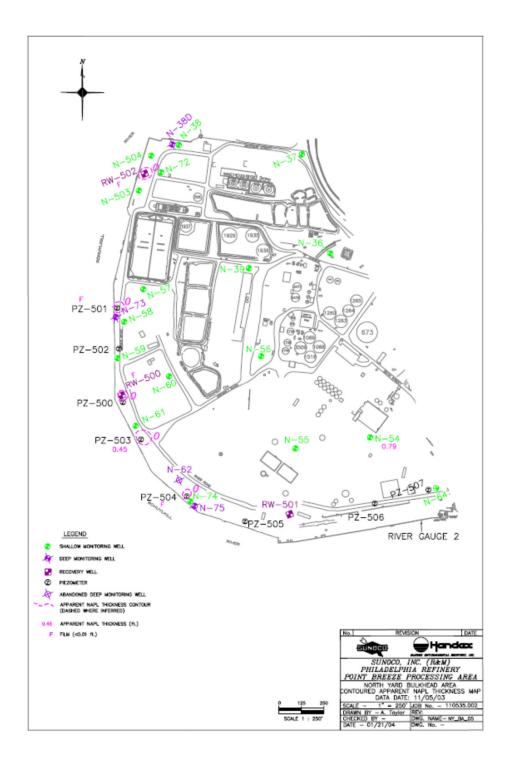
RW-502

PZ-501

RW-500

PZ-503

PZ-504



# Point Breeze 2nd Quarter 2004 Report (pg. 54)

#### **OBSERVATIONS**

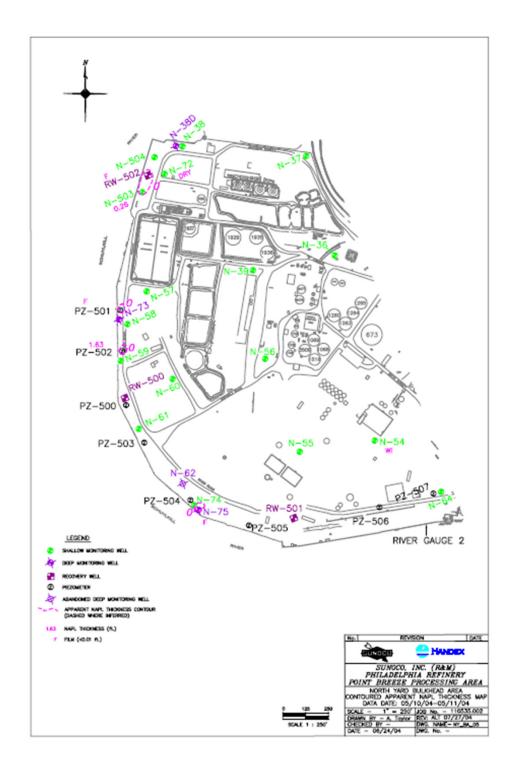
Plume RW-502 now includes N-503

PZ-501 - no change

RW-500 - no plume present

PZ-503 – no plume present

PZ-504 – no longer in plume – plume moved to N-75



Point Breeze 4th Quarter 2004 Report (pg. 257)

#### **OBSERVATIONS**

Plume RW-502 and N-503 now includes N-504

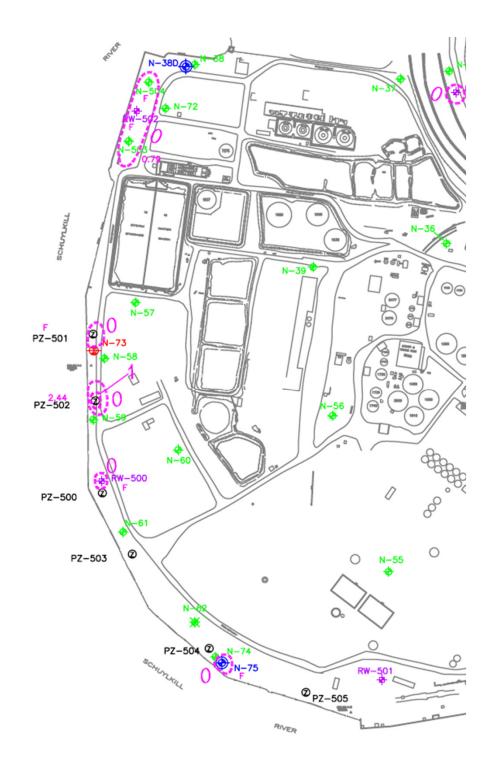
PZ-501 – no change

New Plume PZ-502 – more than 2 ft thick

RW-500 -plume returns

PZ-503 – no plume present

Plume N-75 - no change



Point Breeze 2nd Quarter 2005 Report (pg. 83)

#### **OBSERVATIONS**

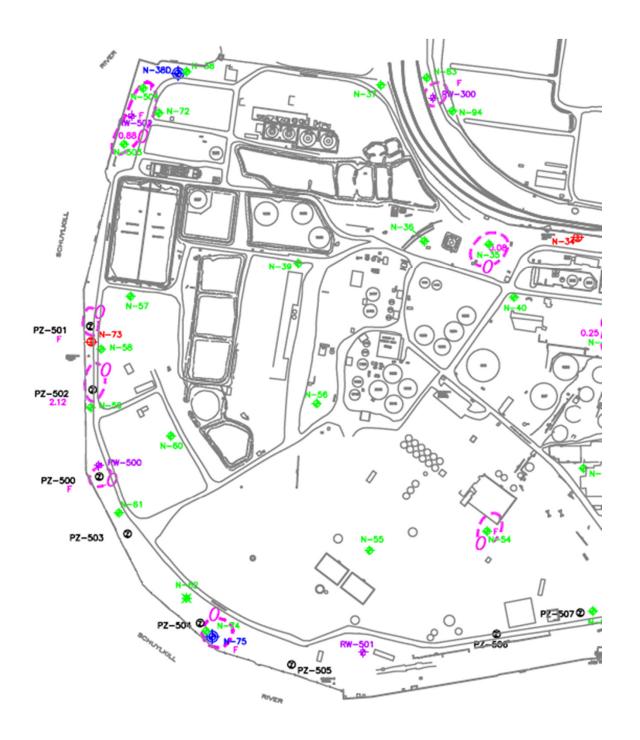
Plume RW-502, N-503 and N-504 – thickness increased slightly

Plume PZ-501 - no change

Plume PZ-502 – still more than 2 ft thick

Plume RW-500 –plume moved to PZ-500

Plume N-75 – now includes N-74



# Point Breeze 4th Quarter 2005 Report (pg. 50)

#### **OBSERVATIONS**

Plume RW-502, N-503 and N-504 – thickness decreased slightly

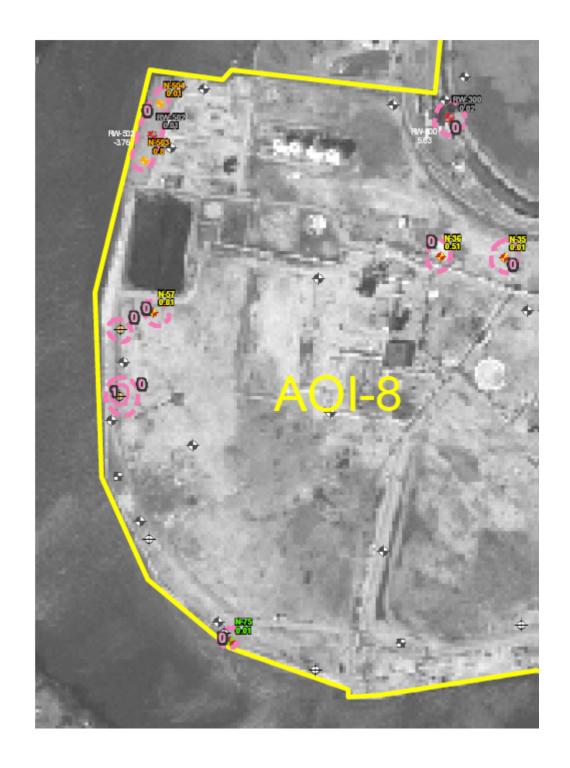
Plume PZ-501 - no change

New Plume N-57

Plume PZ-502 – thickness decreased to more than 1 ft thick

Plume PZ-500 – no longer present

Plume N-75, N-74 – decreased to only N-75



# Point Breeze 2nd Quarter 2006 Report (pg. 97)

#### **OBSERVATIONS**

Plume RW-502, N-503 and N-504 – no longer includes N-504

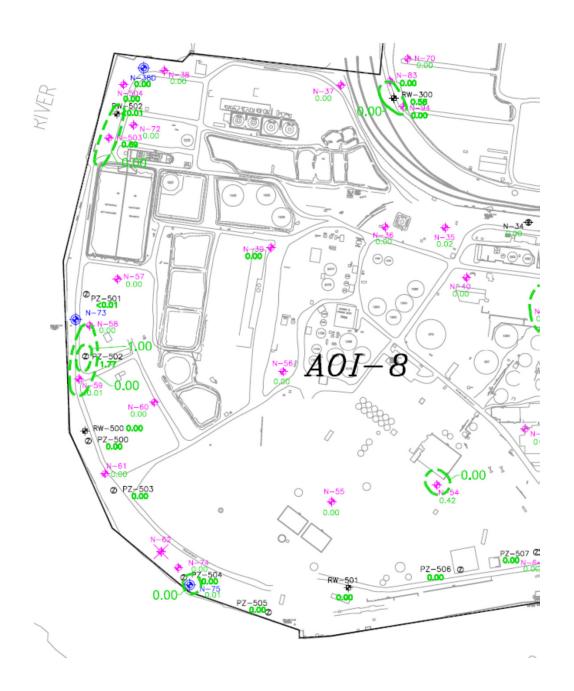
Plume PZ-501 – no longer present

Plume N-57 – no longer present

Plume PZ-502 – now includes N-58 and N-59

Plume PZ-500 – no longer present

Plume N-75 – no change



Point Breeze 4th Quarter 2006 Report (pg. 28)

#### **OBSERVATIONS**

Plume RW-502, N-503 - now includes N-504

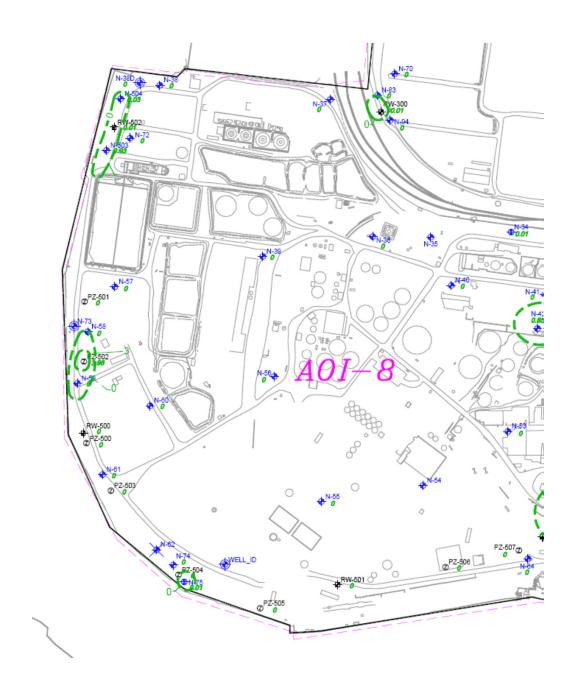
Plume PZ-501 – no longer present

Plume N-57 – no longer present

Plume PZ-502, N-58 and N-59- thickness increased to more than 3 ft

Plume PZ-500 – no longer present

Plume N-75 – no change



# Point Breeze 4th Quarter 2007 Report (pg. 35)

#### **OBSERVATIONS**

Plume RW-502, N-503 and N-504 – no longer includes N-504

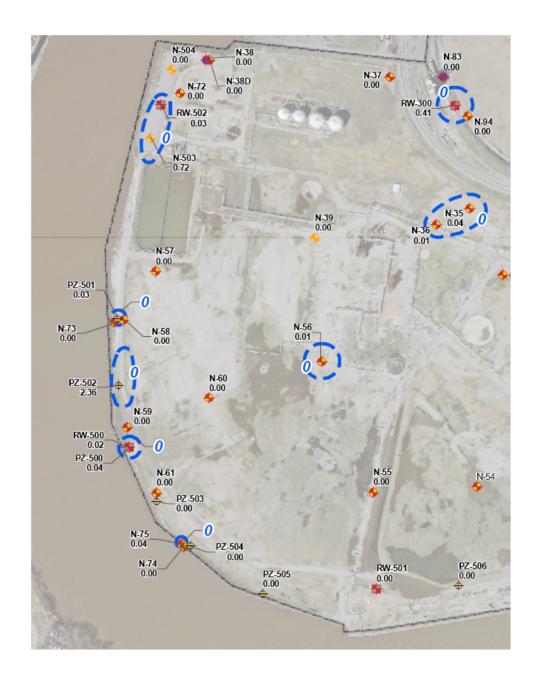
Plume PZ-501 - returned

Plume N-57 – no longer present

Plume PZ-502, N-58 and N-59- no longer includes N-58 and N-59

Plume PZ-500 – returned and includes RW-500

Plume N-75 – thickness increased slightly



# Point Breeze 2nd Quarter 2008 Report (pg. 32)

#### **OBSERVATIONS**

Plume RW-502, N-503 and N-504 - no change

Plume PZ-501 – returned and now includes N-73

Plume N-57 – no longer present

Plume PZ-502, N-58 and N-59 – no longer includes N-58 or N-59

Plume PZ-500 – no longer present

Plume N-75 – slight increase in thickness



### CCR - Figure 5 data collected 11/2003

#### **OBSERVATIONS**

Plume RW-502, N-503 and N-504 – no longer include RW-502 or N-504

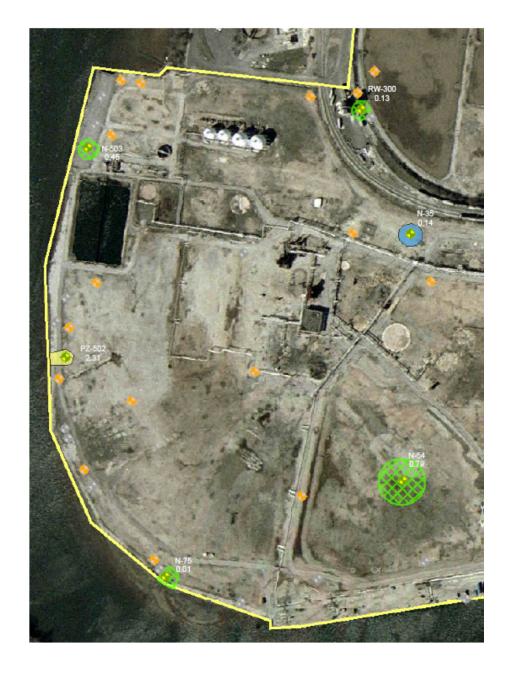
Plume PZ-501 – no longer present

Plume N-57 – no longer present

Plume PZ-502 – increased in thickness slightly

Plume PZ-500 – no longer present

Plume N-75 – slight decrease in thickness



AOI 8 SCR -Figure 11 10/2003

#### **OBSERVATIONS**

Plume N-503- now includes RW-502

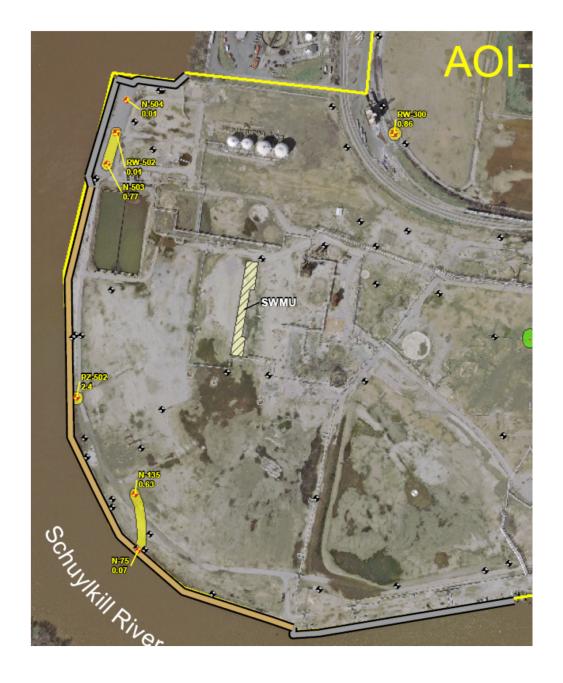
Plume PZ-501 – no longer present

Plume N-57 – no longer present

Plume PZ-502 – increased in thickness slightly

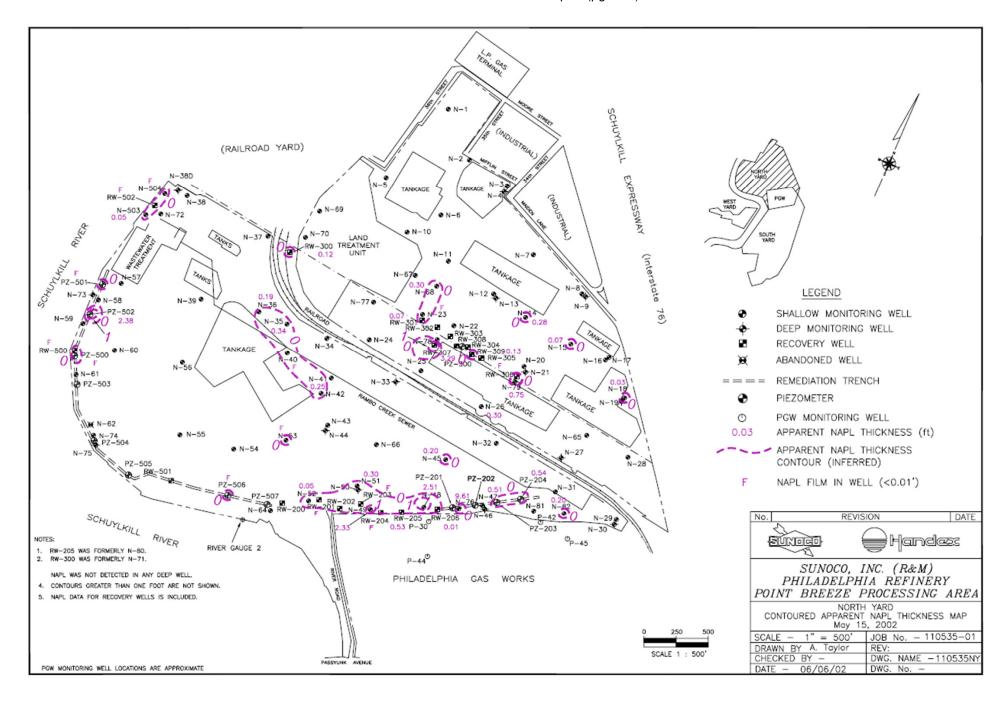
Plume PZ-500 – no longer present

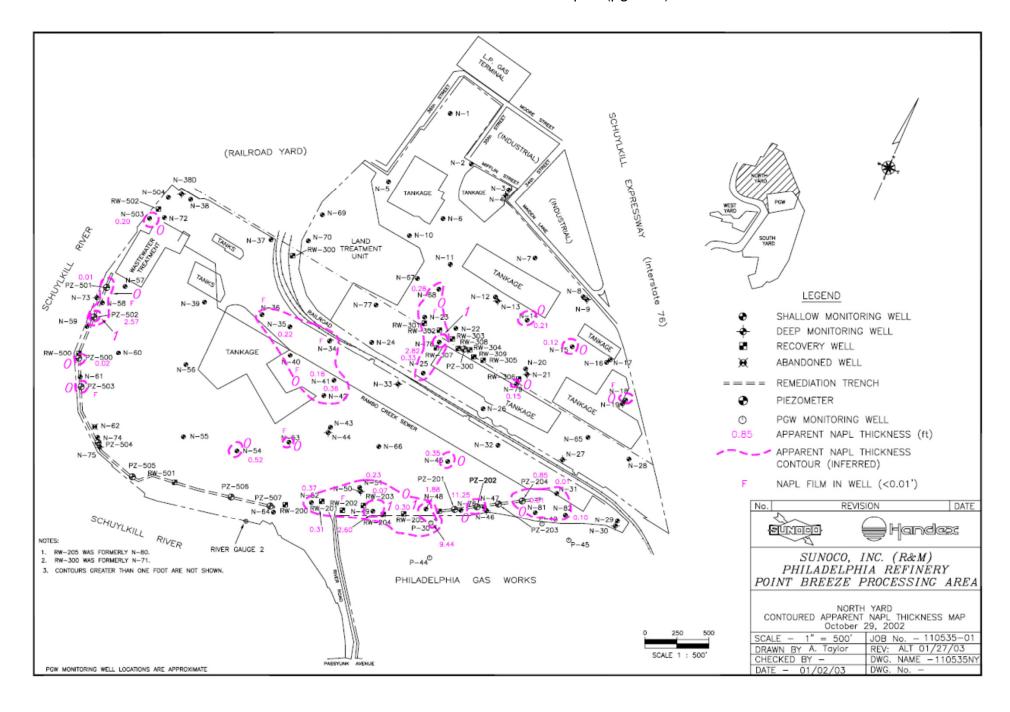
Plume N-75 – increase in thickness and now includes N-135



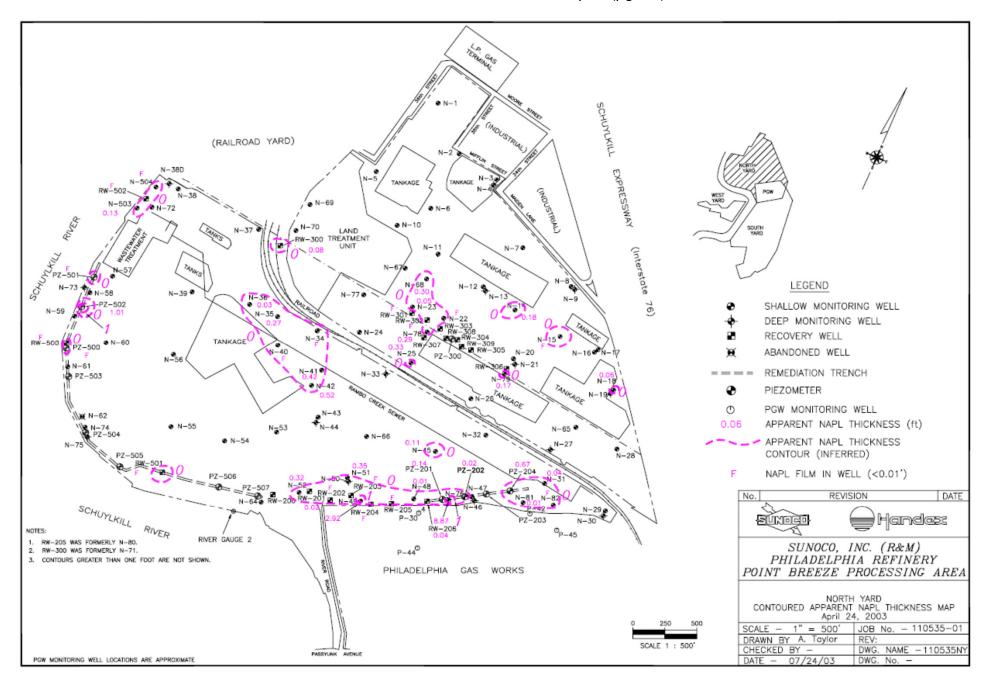
# North Yard Figures

2002 - 2008

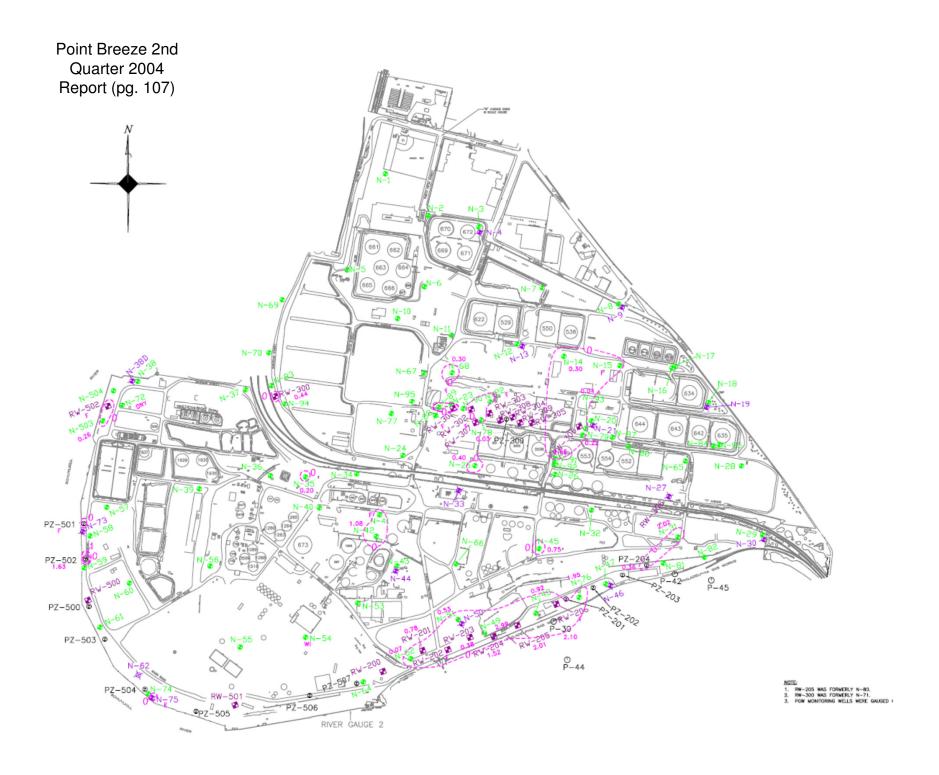


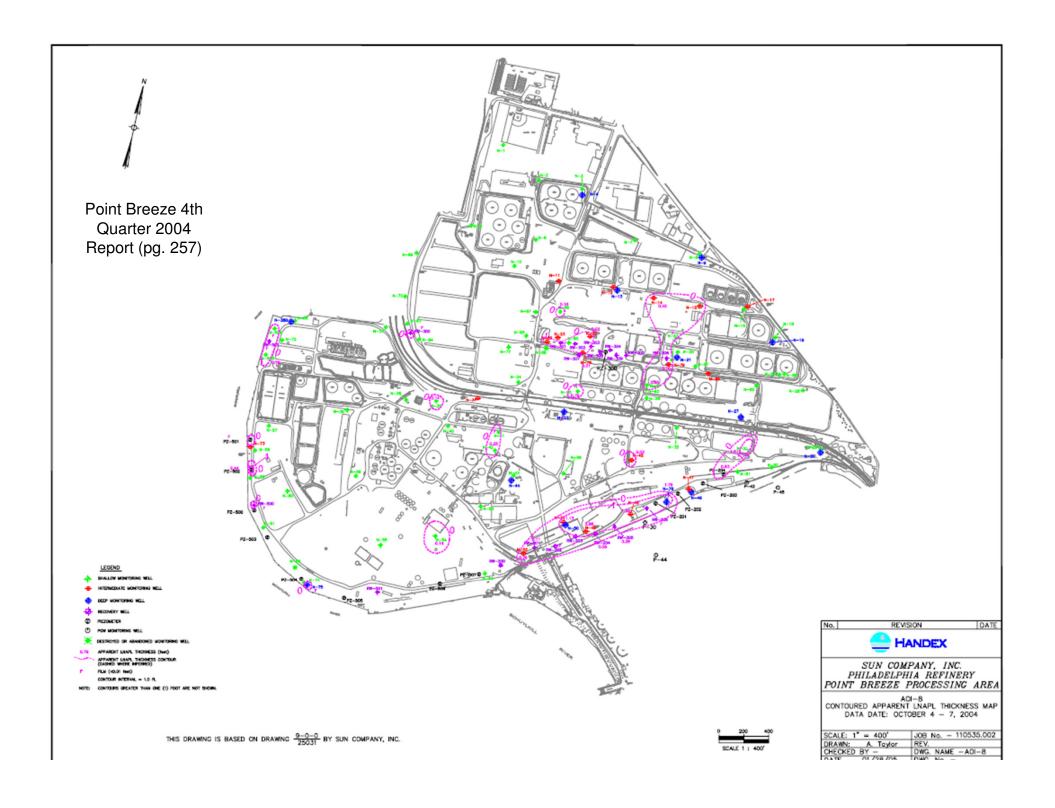


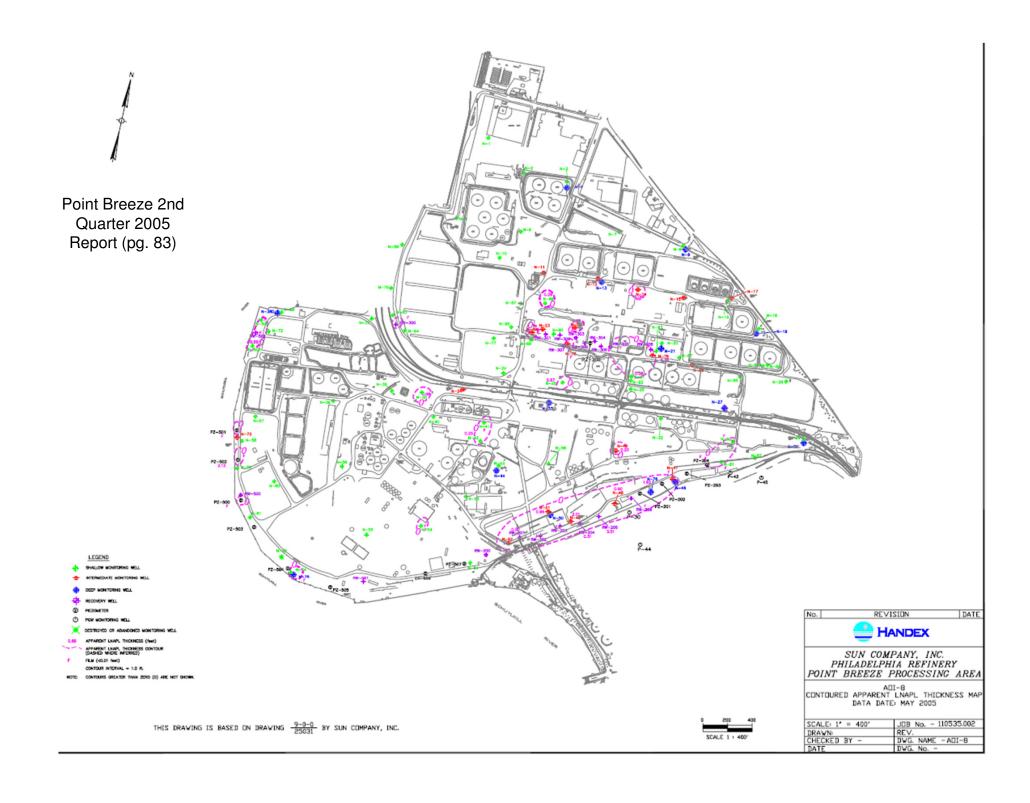
Point Breeze 2nd Quarter 2003 Report (pg. 87)



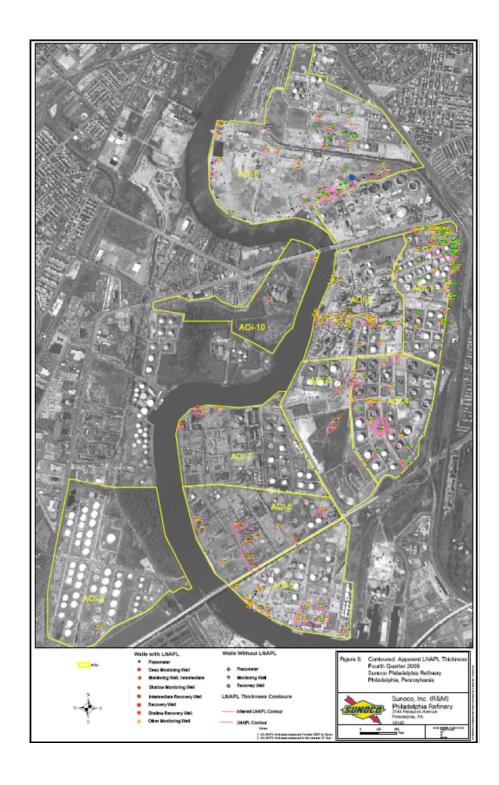
Point Breeze 4th Quarter 2003 Report (pg. 233) PZ-501 PZ-500 PZ-503 0 F - FEM (40.01 FEET) SUNCO, INC. (R&M)
PHILADELPHIA REFINERY
POINT BREEZE PROCESSING AREA
(NORTH YARD)
CONTOURED APPARENT NAFL THICKNESS MAP RIVER GAUGE 2



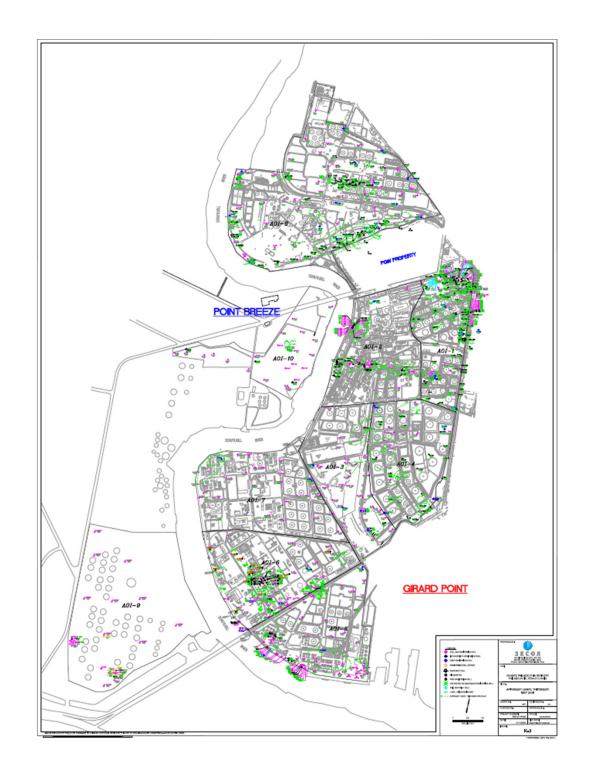


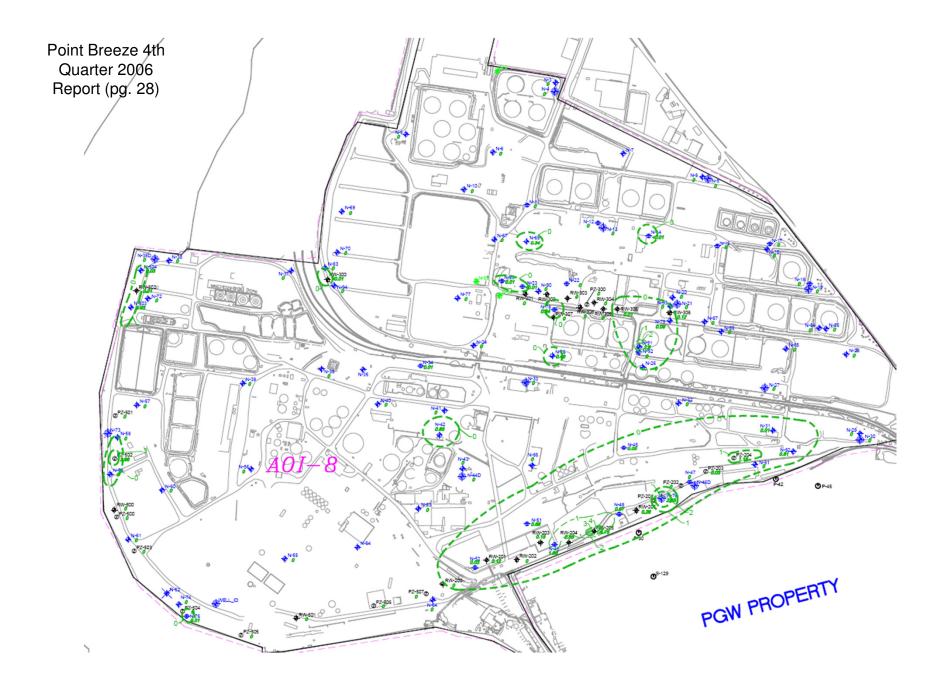


Point Breeze 4th Quarter 2005 Report (pg. 50)

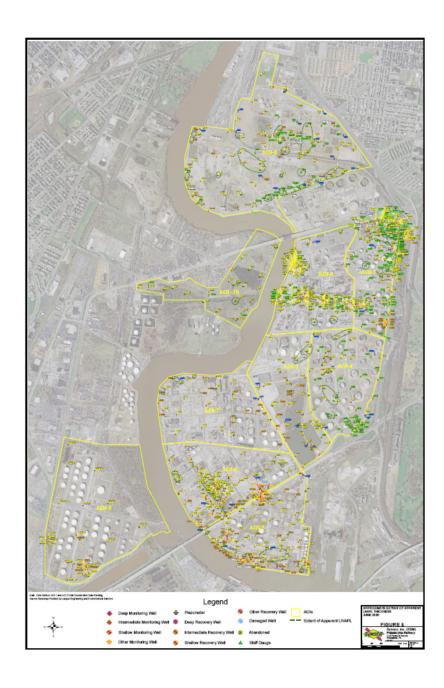


Point Breeze 2nd Quarter 2006 Report (pg. 97)





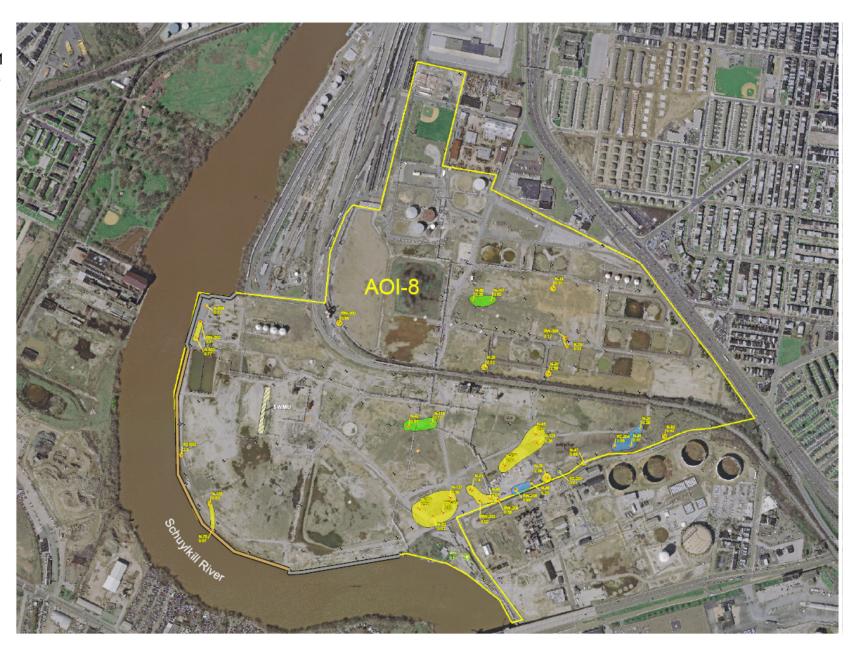
Point Breeze 2nd Quarter 2008 Report (pg. 32)

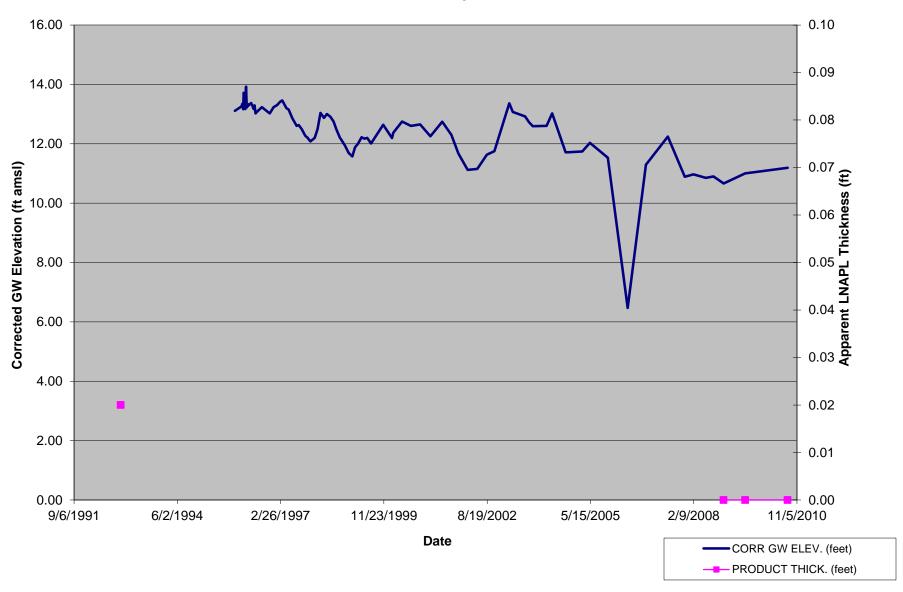


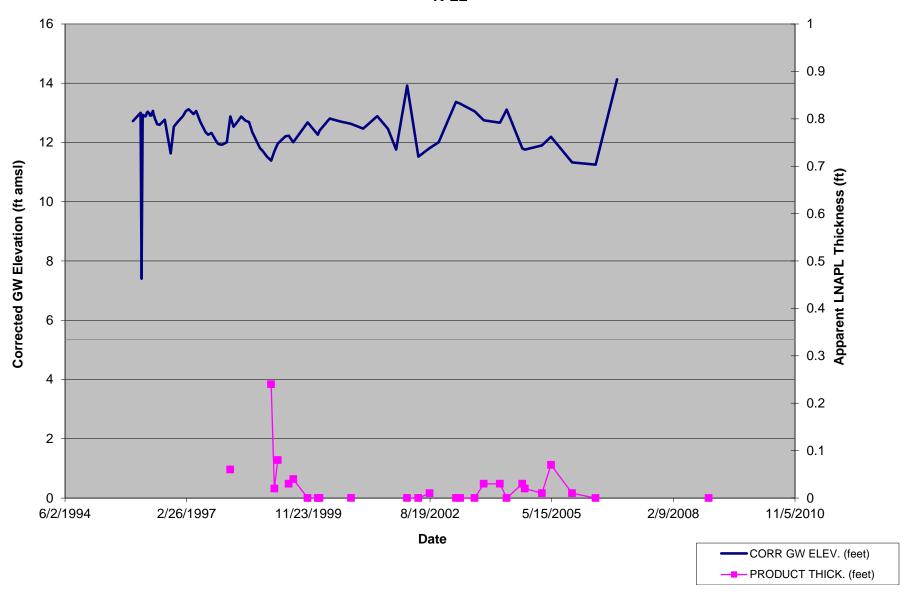
CCR -Figure 5 data collected 11/2003

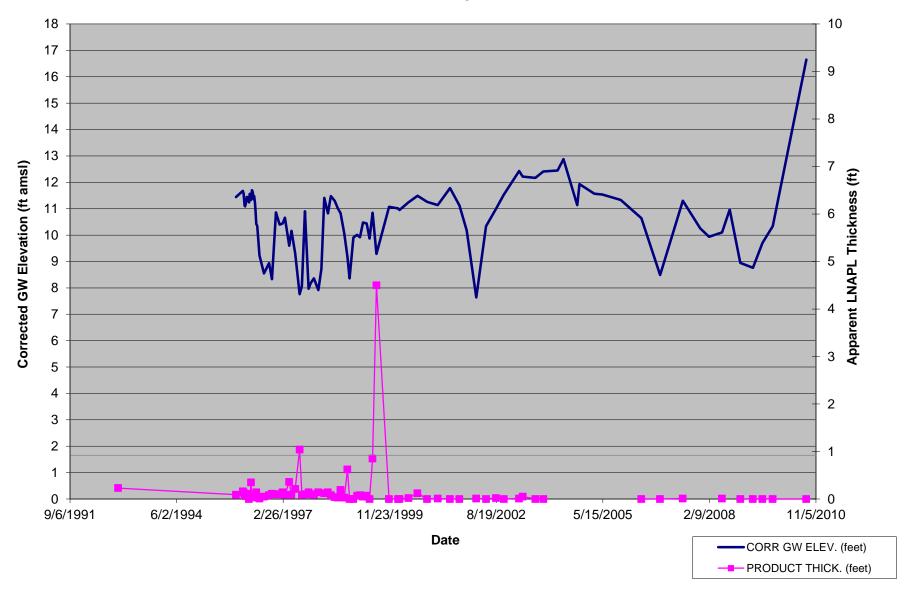


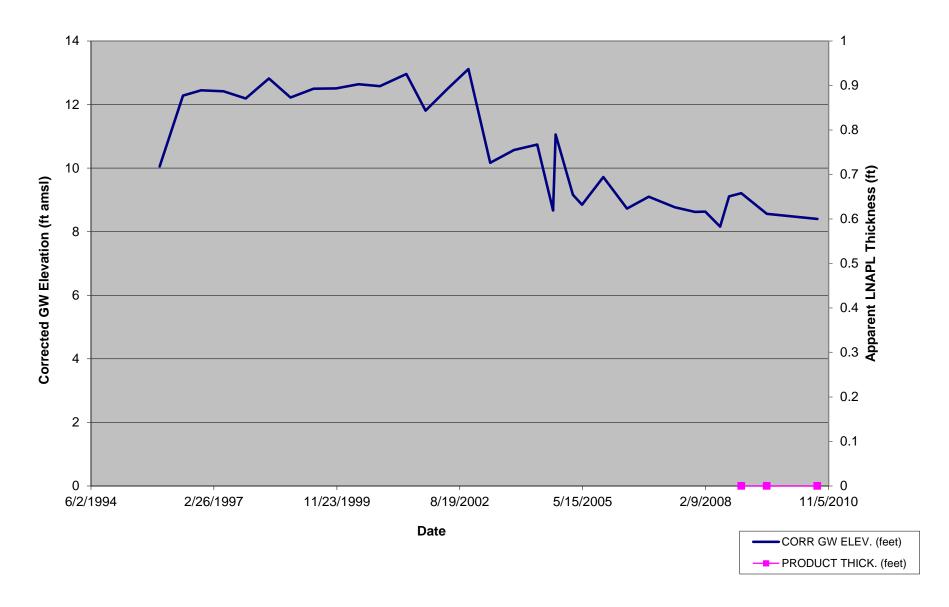
AOI 8 SCR -Figure 11 10/2003

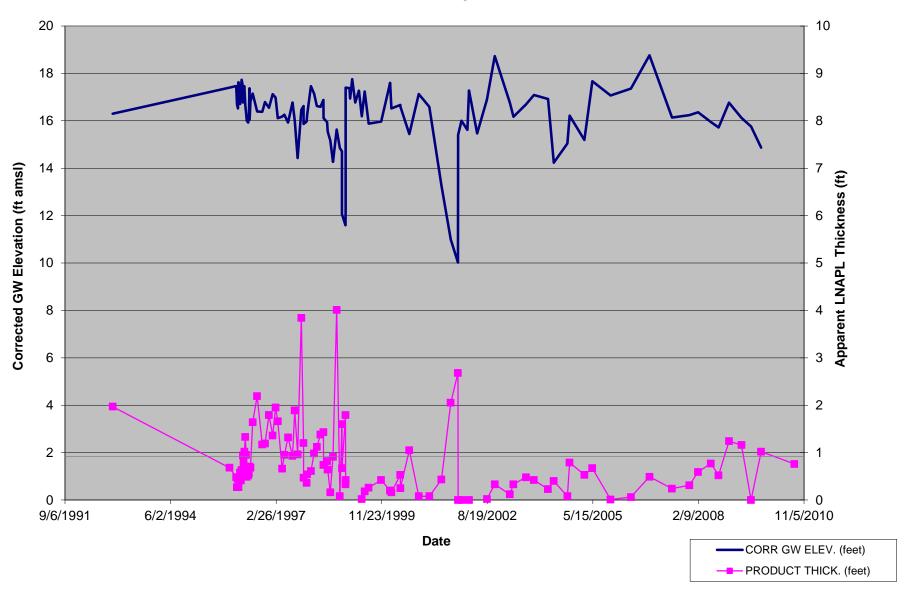


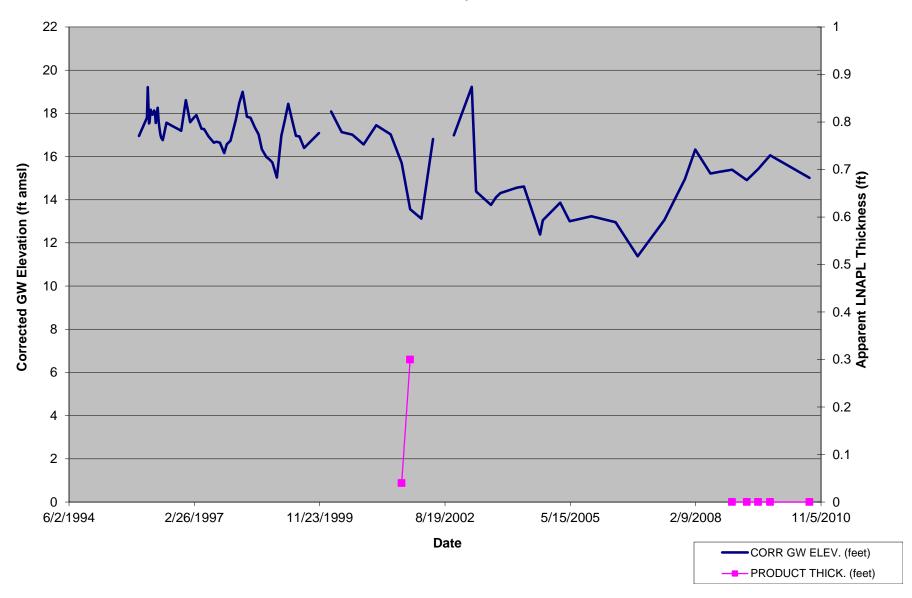


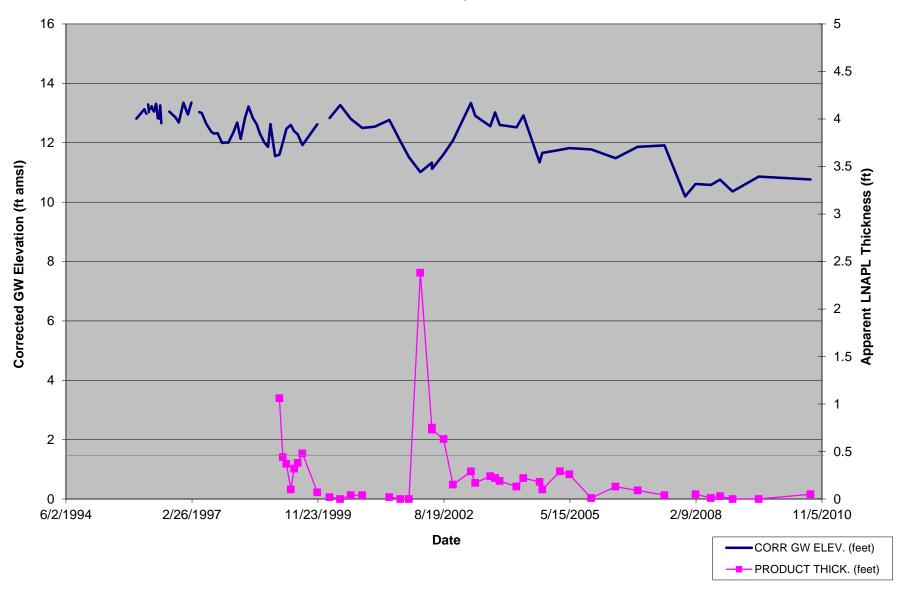


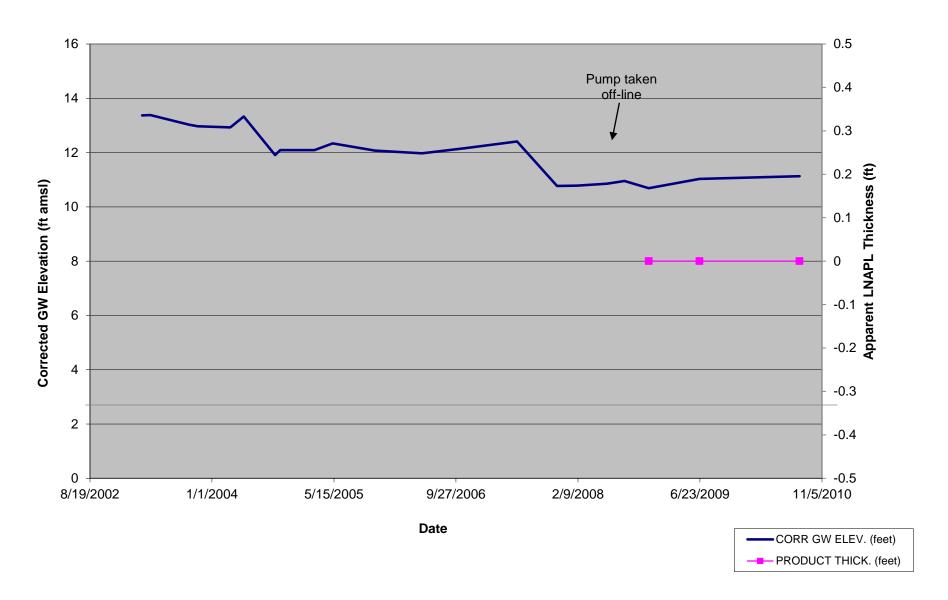




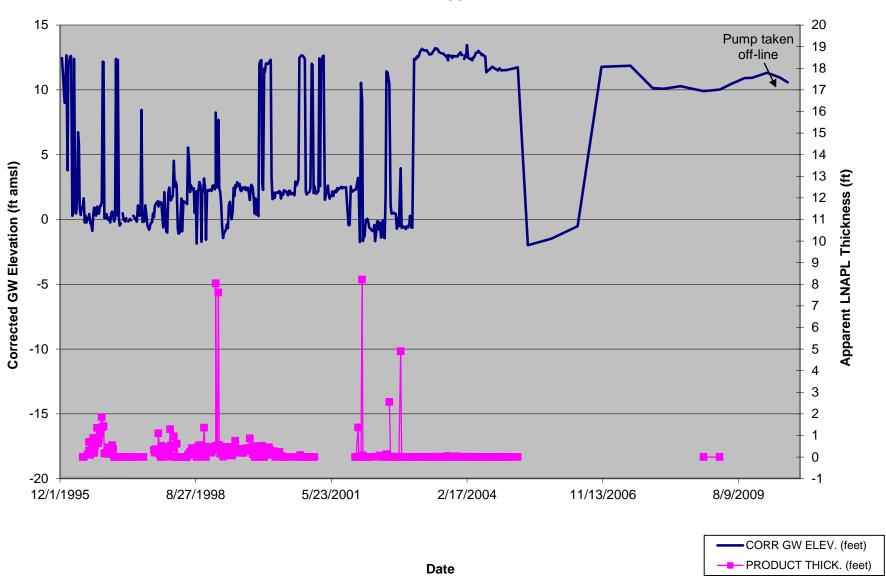




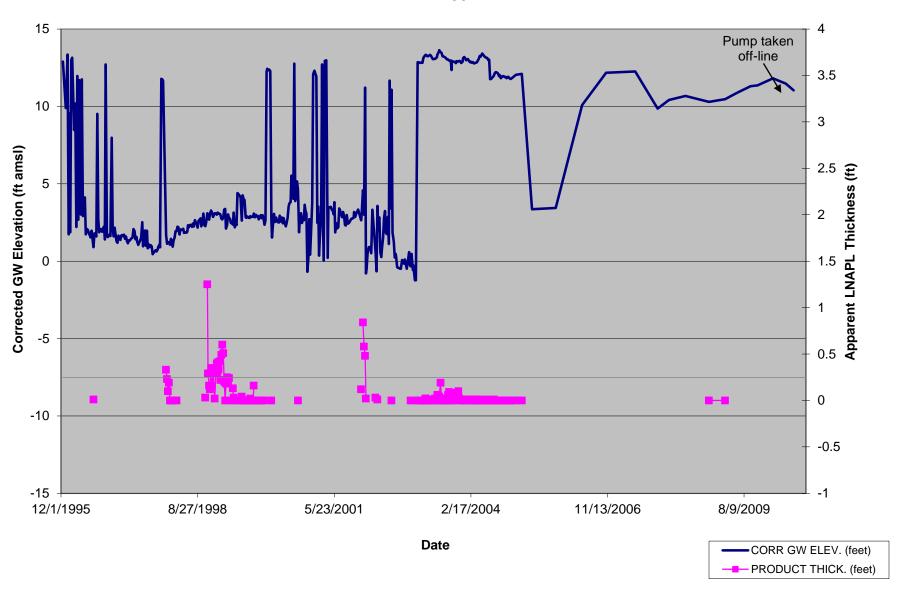


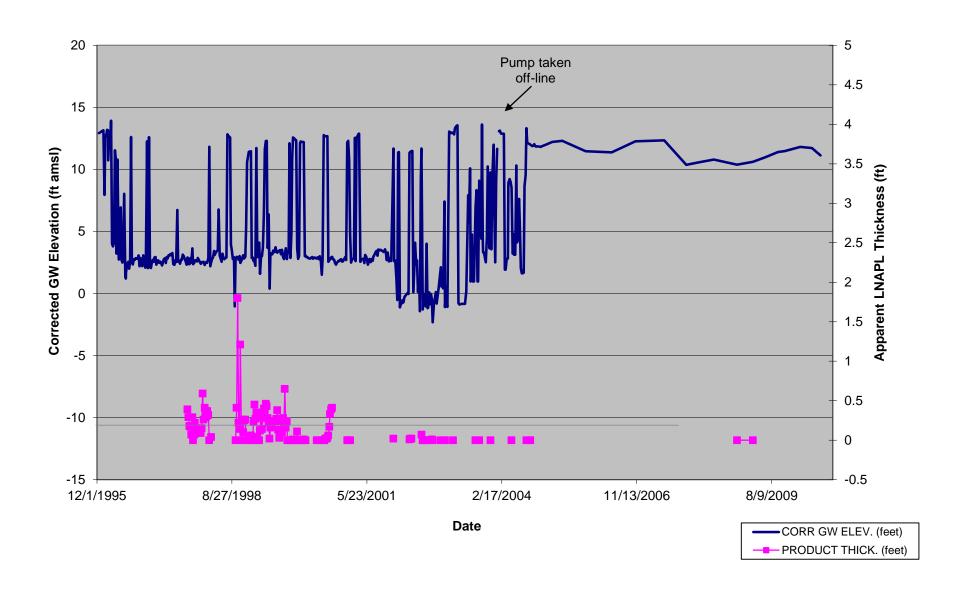


RW-301

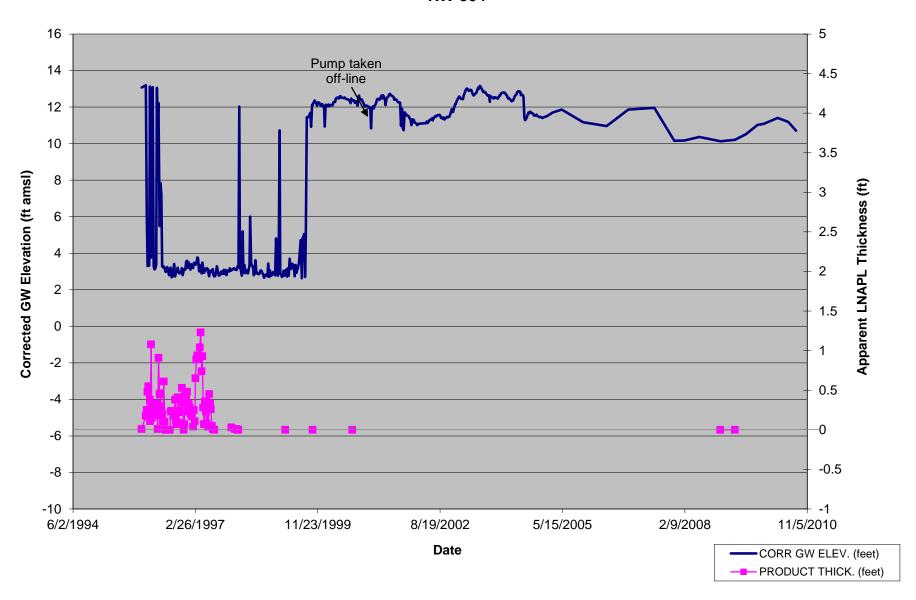


**RW-302** 

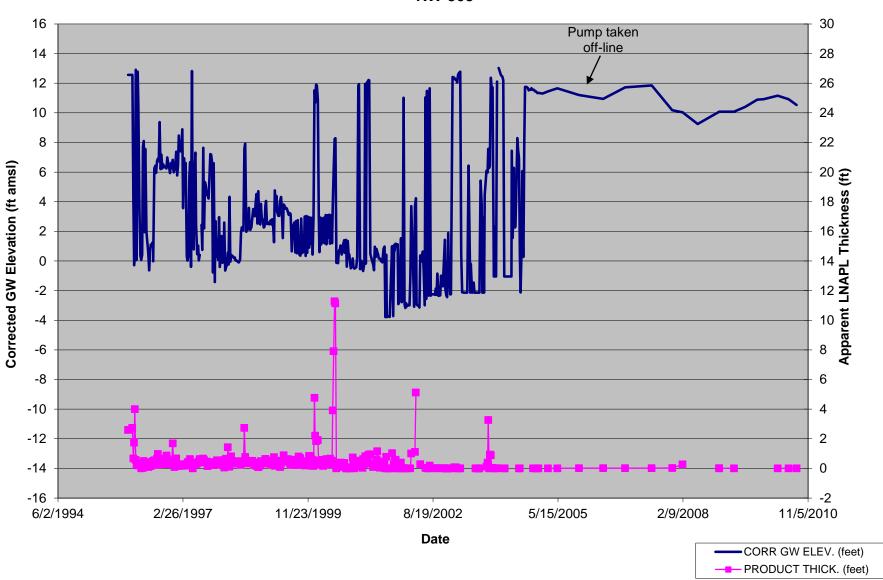




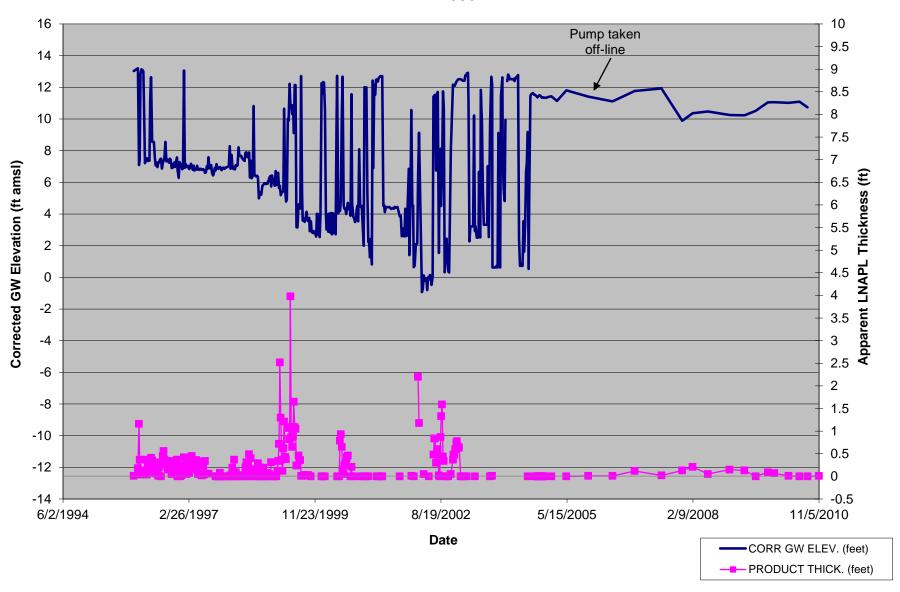
RW-304



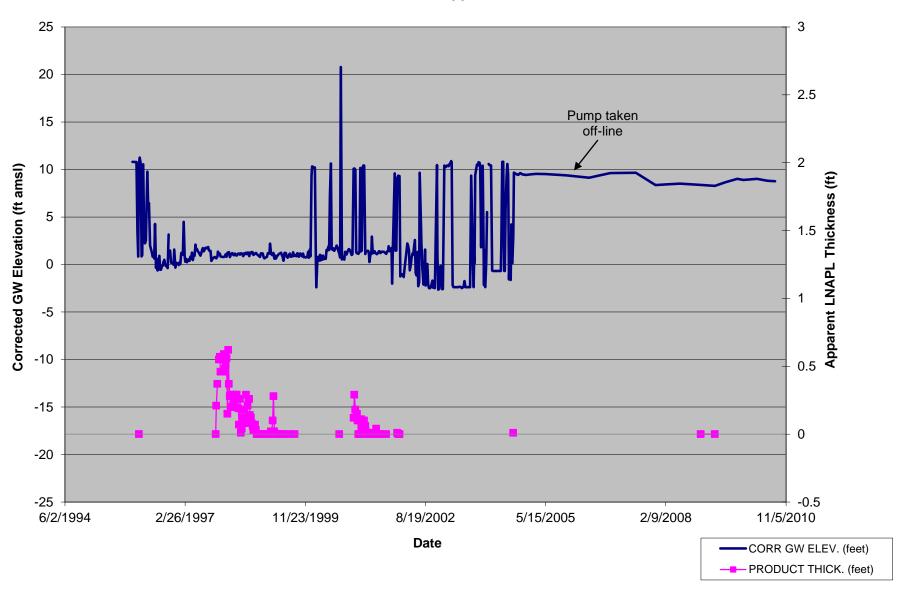
**RW-305** 



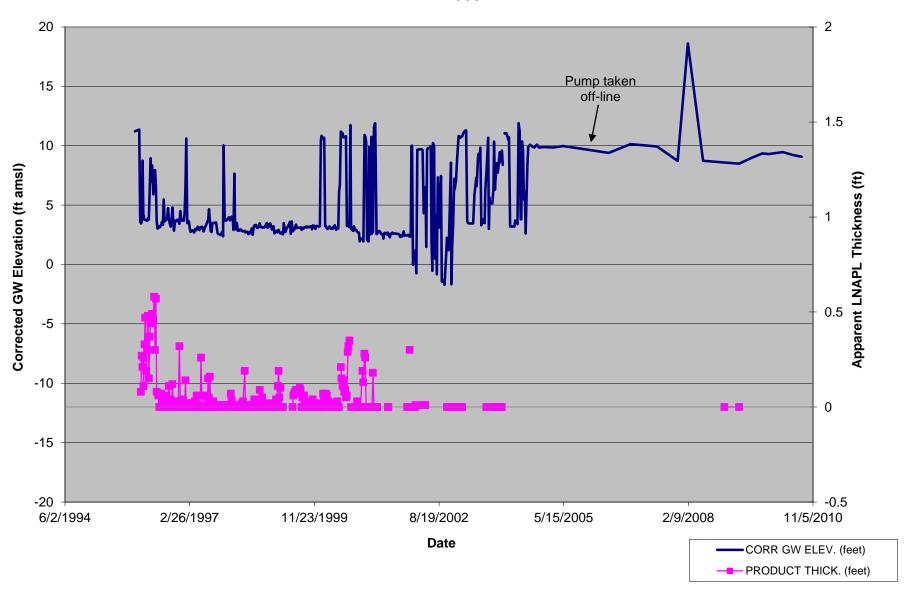
**RW-306** 



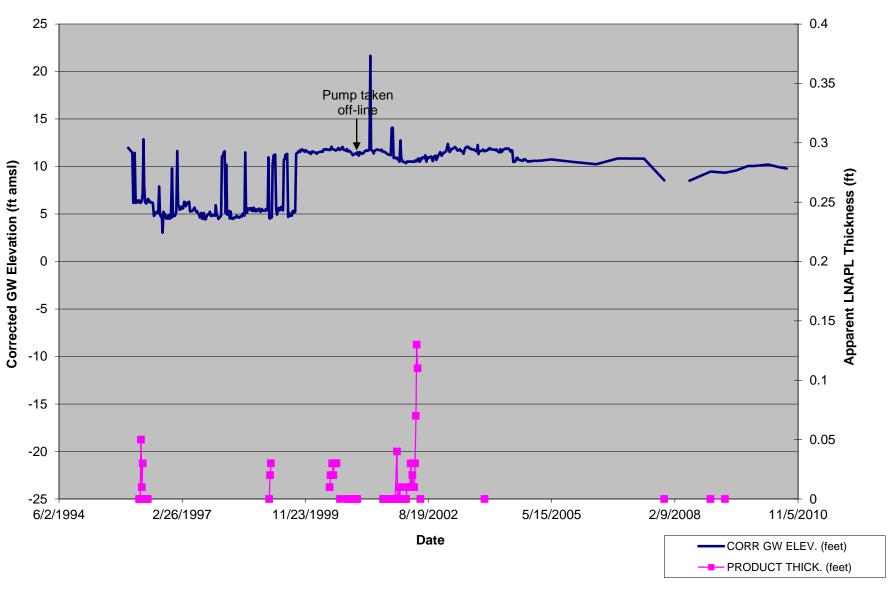
**RW-307** 



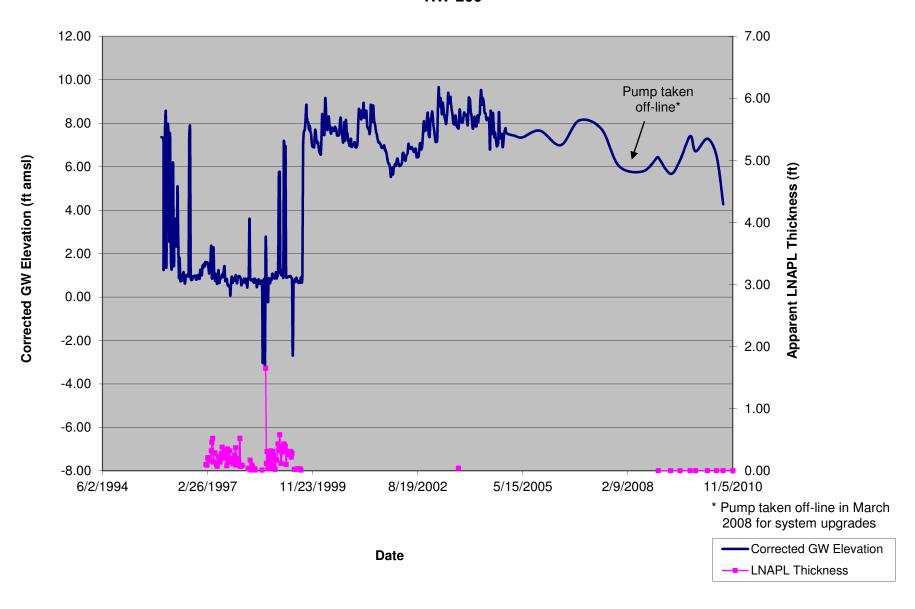
**RW-308** 

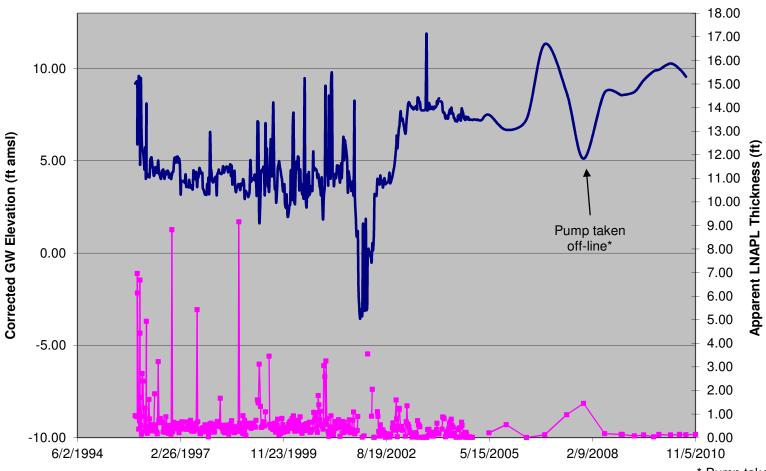






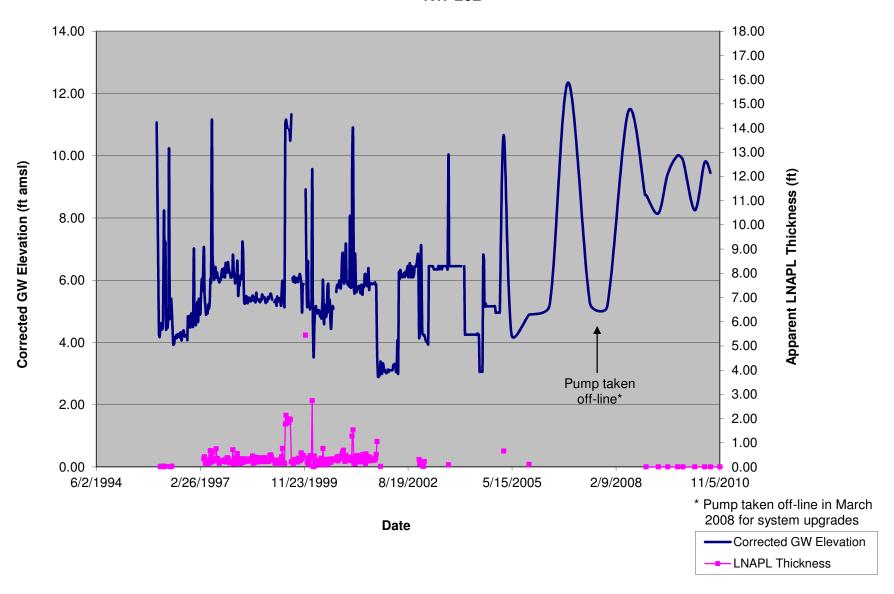
**RW-200** 

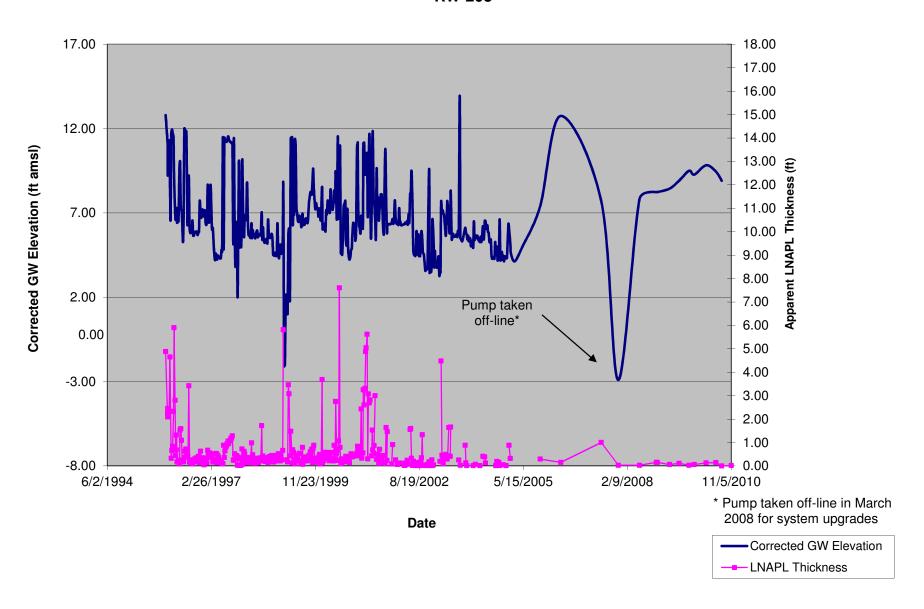


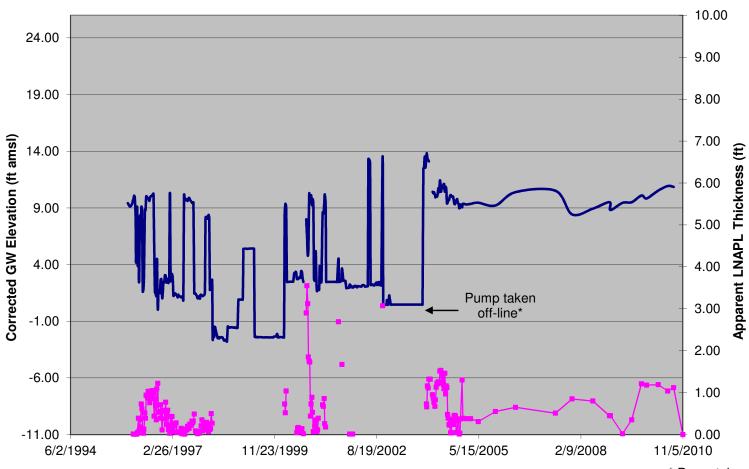


Date

\* Pump taken off-line in March 2008 for system upgrades



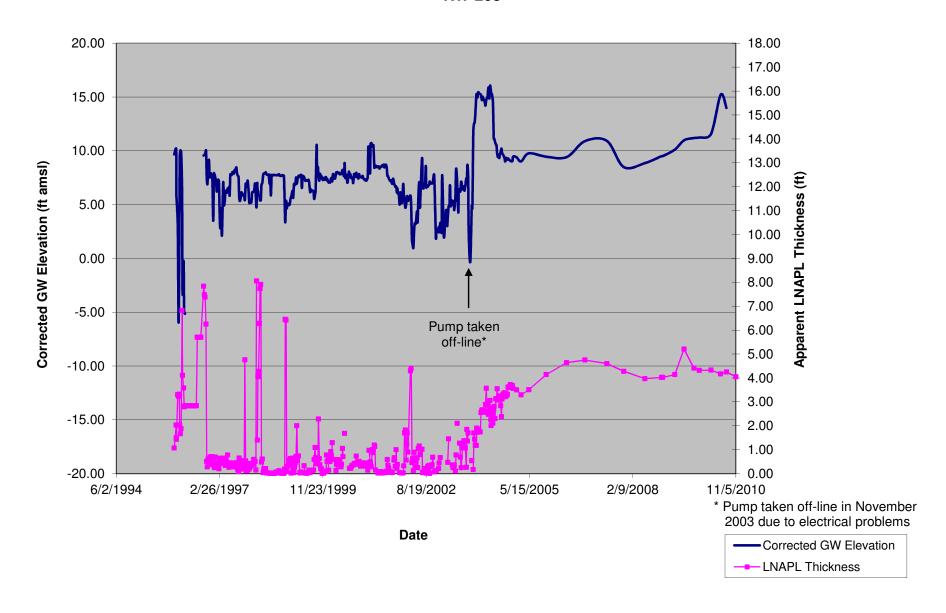


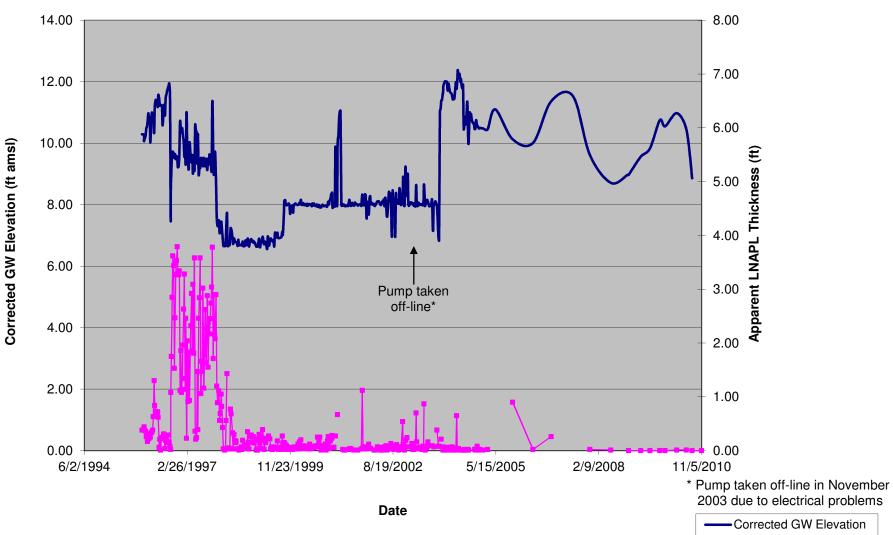


Date

\* Pump taken off-line in November 2003 due to electrical problems

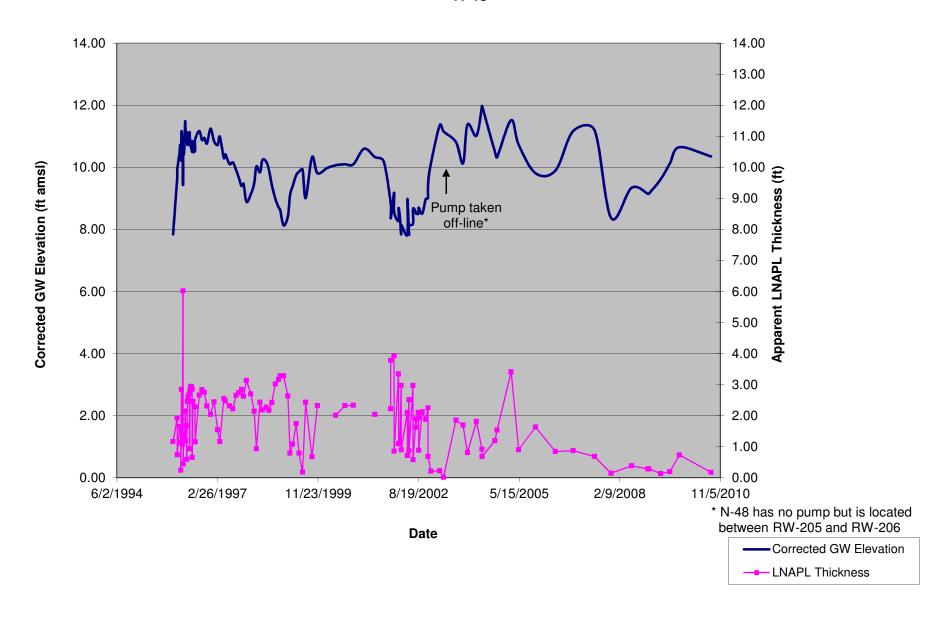
Corrected GW Elevation
LNAPL Thickness

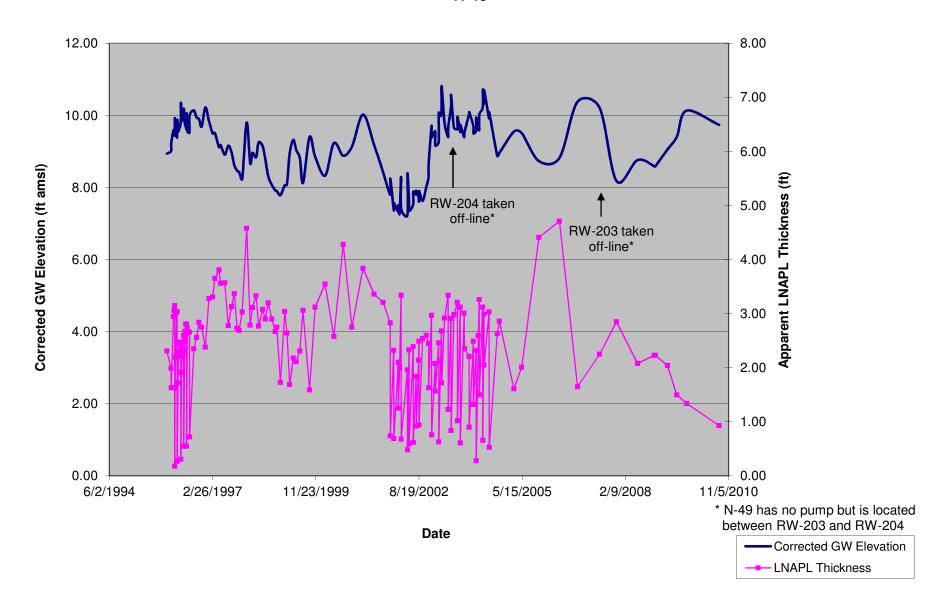


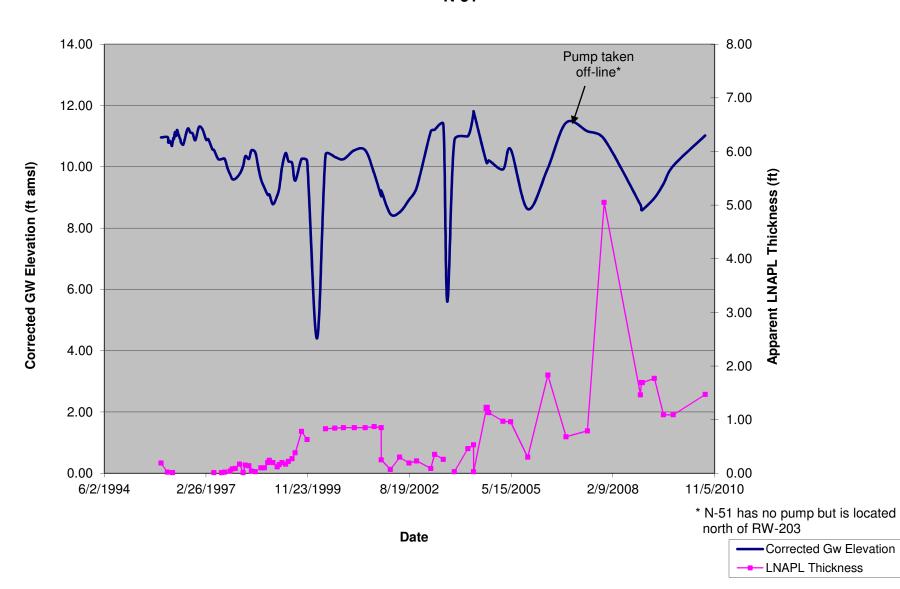


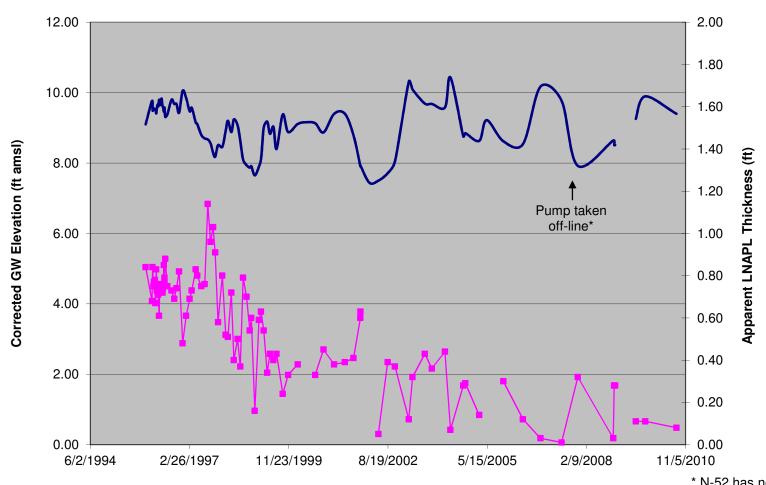
2003 due to electrical problems

Corrected GW Elevation --- LNAPL Thickness









Date

\* N-52 has no pump but is located between RW-200 and RW-201

